

## NON-WOVEN WIPING

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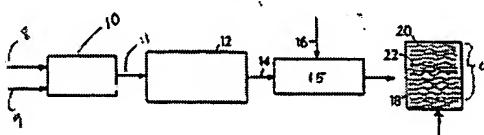
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**[57] Abstract:**

A non-woven wet wipe product (22) comprising a sheet member, pre-wetted with a wet wiping agent (32), and disposed in a fluid-proof package (18), the product comprising a segment of a non-woven self-supporting web (150) comprised of an assemblage of hydroentangled fibers including synthetic thermoplastic strength-providing fibers and absorbent or adsorbent fibers, the non-woven web (150) being in a permanent, dry-creped, heat-set condition defining a succession of ridges (24) and grooves (26) in the overall body (30) of the web, the constituent thermoplastic fibers of the sheet member having been heat-set simultaneously during the imparting of the ridges and grooves to the web, the heat-set condition of the dry-creped thermoplastic fibers preserving the ridge and groove configuration during prolonged presence in the web of the wet agent (32), the wet wiping agent being disposed through the body and on the surface of the dry-creped, heat-set sheet-form member and its constituent fibers. The product, packaged in a stack within a liquid tight container, and a method for making the product are also disclosed.

[51] Int'l Class: B32B00502 B32B00904 D04H00145

**[57] Claims:****WHAT IS CLAIMED IS:**

1. A non-woven wet wipe product (22) comprising a sheet member, pre-wetted with a wet wiping agent (16), and disposed in a fluid-proof package (18), the product comprising: a. a segment of a non-woven self-supporting web (11, 120, 150) comprised of an assemblage of hydroentangled fibers (8, 9) including synthetic thermoplastic strengthproviding fibers (8) and absorbent or adsorbent fibers (9), b. the non-woven web (14) being in a permanent, dry-creped, heat-set condition defining a succession of ridges (24) and grooves (26) in the overall body (30) of the web, the constituent thermoplastic fibers (8) of the sheet member having been heat-set simultaneously during the imparting of the ridges and grooves to the web, the heat-set condition of the drycreped thermoplastic fibers preserving the ridge and groove-configuration during prolonged presence in the web of the wet agent (16), c. the wet wiping agent (16) being disposed through the body (30)and on the surface of the dry-creped, heat-set sheet-form member and its constituent fibers (8, 9).
2. The wet wipe product (22) of claim 1 in which the sheet has been coarsely drycreped, resulting in a coarse distribution of ridge formations (24) in the sheet.
3. The wet wipe product of claim 1 in which there are between about 8 and 25 heat-set ridges (24) per lineal inch of the web (between about 3.1 and 9.8 ridges per linear cm).
4. The wet wipe product (22) of claim 1 in which there are between about 8 and 15 heatset ridges (24) per lineal inch of the web (between about 3.1 and 5.9 ridges per lineal cm).
5. The wet wipe product (22) of claim 1 in which there are between about 15 and 20 heat-set ridges (24) per lineal inch of the web (between about 5.9 and 7.9 ridges per lineal cm).
6. The wet wipe product (22) of claim 1 in which there are between about 20 and 25 heat-set ridges (24) per lineal inch of the web (between about 7.9 and 9.8 ridges per lineal cm).
7. The wet wipe product (22) of claim 1 in which the sheet member is comprised of between about 1/3 and 2/3 by weight absorbent or adsorbent fibers (9) and between about 1/3 and 2/3 by weight of synthetic thermoplastic, strength-imparting fibers (8).
8. The wet wipe product (22) of claim 1 in which the sheet member comprises about equal weight of the absorbent or adsorbent fibers and the thermoplastic, strength-imparting fibers (8).
9. The, wet wipe product (22) of claim 1 in which the thermoplastic fibers (8) comprise PET (polyester).

10. The wet wipe product (22) of claim 1 in which the thermoplastic fibers (8) comprise polypropylene.
11. The wet wipe product (22) of claim 1 in which the absorbent or adsorbent fibers (9) are cellulosic.
12. The wet wipe product (22) of claim 11 in which the cellulosic fibers comprise natural fibers.
13. The wet wipe product (22) of claim 1 in which the absorbent or adsorbent fibers (9) comprise rayon.
14. The wet wipe product (22) of claim 1 comprising fibers (8) of PET and fibers (9) of wood pulp.
15. The wet wipe product (22) of claim 1 in which the web (11, 120, 150) comprises a spunlace web (120).
16. The wet wipe product (22) of claim 1 in which the wet wiping agent (16) comprises an aqueous agent.
17. The wet wipe product (22) of claim 16 in which the wet wiping agent (16) comprises one of a soap, a detergent, a solvent, a cleaning, a window washing, a sanitizing, a biociding, a polishing, an abrading and a neutralizing agent.
18. The wet wipe product (22) of claim 16 in which the wet wiping agent (16) comprises one of an insect repellent, a paint solvent, a paint remover, a finish remover, an oil solvent, a grease solvent, a cosmetic remover, a makeup remover, a stain remover, a stain, a paint, a varnish, a wax and a polish.
19. A package (18) comprising a face-to-face stack (21) of a plurality of sheet members (22), each sheet member comprising:
  - a. a segment of a non-woven self-supporting web (11, 120, 150) comprised of an assemblage of hydroentangled fibers (8, 9) including synthetic thermoplastic strengthproviding fibers (8) and absorbent or adsorbent fibers (9),
  - b. the non-woven web (14) being in a permanent, dry-creped, heat-set condition defining a succession of ridges (24) and grooves (26) in the overall body (30) of tile web, the constituent thermoplastic fibers (8) of the sheet member having been heat-set simultaneously during the imparting of the ridges (24) and grooves (26) to the web, the heatset condition of the dry-creped thermoplastic fibers (8) preserving the ridge (24) and groove (26) configuration during prolonged presence in the web of the wet agent (16),
  - c. the wet wiping agent (16) being disposed through the body and on the surface of the dry-creped, heat-set sheet-form member and its constituent fibers (8, 9).
20. A method of producing a wet wipe product (22) comprising:
  - a. providing a self-supporting non-woven assemblage (11, 150) of hydroentangled fibers (8, 9) including synthetic thermoplastic strength-providing fibers (8) and

absorbent or adsorbent fibers (9), b. passing the non-woven assemblage (11, 120, 150) through a dry-creping machine (149) to impart ridges and grooves to a body (30) of the assemblage while simultaneously heating the assemblage to a temperature above the temperature required to heat-set the thermoplastic fibers (8), and c. thereafter sizing the assemblage into a wipe member (22), pre-applying a wet wiping agent (16) so that the wet wiping agent is disposed through the body (30) and on the surface of the dry-creped sheet-form member and its constituent fibers (8, 9), and sealing the wipe member in a fluid-tight package (18).

21. The method of claim 20 in which the dry-creping is performed under conditions to produce coarse dry-crepe.
22. The method of claim 21 comprising employing a spunlace process for providing the nonwoven assemblage (11, 150).
23. The method of claim 21 in which the assemblage (11, 120, 150) is formed by providing a carded web of polyester fibers (8) introducing a layer of wood pulp (9) to the carded web, and subjecting the layer of wood pulp and carded web to hydroentanglement followed by dewatering and drying prior to dry-creping.
24. The method of claim 21 comprising conducting the dry-creping step with a bladed drycreper comprising a driven roll (152), a pressing surface (154, 155) pressing the fiber assemblage (150) against the driven roll sufficiently to cause the fiber assemblage to be advanced forward, and opposing the advance of the assemblage in the direction of the plane of the assemblage with a retarder blade (156), a tip of which is held adjacent the driven roll, at least one surface of the drycreper being heated to heat the thermoplastic fiber constituent to heat-set temperature of the thermoplastic fibers.
25. The method of claim 24 in which the sorbent fibers (9) comprise wood pulp fibers, the fiber assemblage is substantially free of thermoplastic binder, and the dry-creping is conducted in a manner leaving the wood pulp fibers substantially permanently uncompressed in the direction of the thickness of the assemblage.
26. The method of claim 24 in which the thermoplastic fibers (8) include PET (polyester) and said surface of the drycreper (149) is heated to a temperature between about 250 and 350 F (139 C and 194 C).
27. The method of claim 26 in which the pressing surface (154, 155) is so heated.
28. The method of claim 27 in which the driven roll (152) is so heated.
29. The method of claim 26 in which the driven roll (152) is so heated.
30. The method of claim 24 in which the dry-creping and simultaneous heat setting is carried out under conditions in which the absorbent or adsorbent

fibers (9) are substantially uncompressed in a direction of thickness of the web (11, 120, 150) during formation of the dry-crepe.

31. The method of claim 24 in which the driven roll (152) of the drycreper includes a continuous cylinder, the roll being equipped with an internal heater (H').

32. The method of claim 31, wherein the internal heater (H') comprises an electric resistance heater.

33. The method of claim 31, wherein the internal heater (H') comprises heat exchange passages through which a hot fluid is passed.

34. The method of claim 33, wherein the hot fluid is one of hot water, steam, hot gas, hot air and combustion gas.

35. The method of claim 25 in which the dry-creping and simultaneous heat-setting is conducted in a manner to shorten the web (11, 150) at least 4%, increasing a bulk thickness of the sheet member.

36. The method of claim 35 in which the dry-creping and simultaneous heat-setting is conducted in a manner to shorten the web (11, 120, 150) within the range between about 4 to 25%.

37. The method of claim 35 in which the dry-creping and simultaneous heat-setting is conducted in a manner to shorten the web (11, 120, 150) within the range between about 4 and 12%.

38. The method of claim 35 in which the dry-creping and simultaneous heat-setting is conducted in a manner to shorten the web (11, 120, 150) within the range between about 4 and 8%.

39. The method of claim 24, in which a plurality of said sheet members (22), in a stack (21) in face-to-face contact, are packaged wet in a fluid tight container (18). 19

40. The method of claim 39 including adding to the sheet members (22) before completing the packaging one of a soap, a detergent, a solvent, a cleaning, a window washing, a sanitizing, a biociding, a polishing, an abrading and a neutralizing agent.

41. The method of claim 39 including adding to the sheet members (22) before completing the packaging one of an insect repellant, a paint solvent, a paint remover, a finish remover, an oil solvent, a grease solvent, a cosmetic remover, a makeup remover, a stain remover, a stain, a paint, a varnish, a wax and a polish.